Amendments to the Specification

Please replace the two paragraphs beginning at page 1, line 5 by the following amended paragraphs.

This application is a continuation of U.S. Patent Application Serial No. 09/181,028, filed October 27, 1998, now U.S. Patent No. 6,651,315, which is a continuation of U.S. Patent Application Serial No. 08/900,787, filed July 25, 1997, now U.S. Patent No. 5,852,397, which is a continuation of U.S. Patent Application Serial No. 08/727,869, filed October 8, 1996, now abandoned, which is a continuation of U.S. Patent Application Serial No. 08/302,138, filed September 7, 1994, now abandoned, which is a continuation-in-part of (1) copending, commonly assigned U.S. Patent Application Serial No. 08/152,070, filed November 12, 1993, by Graves, Zhang, Chandler, Chan and Fang, now abandoned, ~~(Docket No. MP1454-US2)~~ which is a file wrapper continuation of U.S. Patent Application Serial No. 07/910,950, filed July 9, 1992 ~~(Docket No. MP1454-US1)~~, now abandoned, and (2) copending, commonly assigned U.S. Patent Application Serial No. 08/121,7 17, filed September 15, 1993, by Fang, Siden, Thompson and Zhang, now abandoned ~~(Docket No. MP1490-US1)~~, the disclosures of which are incorporated herein by reference for all purposes.

This application is also related to copending International Application No. PCT/US93/06480, filed July 8, 1993, by Raychem Corporation ~~(Docket No. MP1454-PCT)~~ which claims priority from U.S. Patent Application Serial No.07/910,950, to copending, commonly assigned U.S. Patent Application Serial No. 08/242,916, filed May 16, 1994, by Zhang and Fang, now abandoned if favor of U.S. Application Serial No. 08/710,925, now U.S. Patent No. 5,831,510 ~~(Docket No. MP1509-US1)~~, and to copending, commonly assigned U.S. Patent Application Serial No. 08/257,586, filed June 9, 1994, by Zhang, Thompson, Toth and Beadling, now abandoned in favor of U.S. Application Serial No. 08/808,135, now U.S. Patent No. 5,864,281 ~~(Docket No. MP1515-US1)~~. The entire disclosure of each of those U.S. and International patent applications is incorporated herein by reference for all purposes.

Please replace the paragraph beginning at page 4, line 6 by the following amended paragraph.

The novel devices of the invention can be made by securing electrodes of appropriate shapes to resistive elements of the desired final shape; or by securing electrode precursors of appropriate shapes to resistive elements which are larger than the desired final shape, and then dividing the assembly into a plurality of devices of the desired final shape or shapes; or by preparing a plurality of devices of the desired final shape or shapes by division of a simple

laminate of constant cross-section and, if desired or necessary, and before or after the division, removing unwanted portions of one or both of the electrodes. Such removal can be effected for example by milling or by etching. Preferably such removal of unwanted portions of the electrodes removes little or none of the PTC resistive element, which provides desirable physical strength to the connection leg. Preferably also, when, as is preferred, the connection leg includes an extension of only one of the electrodes, the leg does also include a residual portion of the second electrode. The residual portion is not electrically connected to the main portion, but provides valuable physical properties, including strength and resistance to deformation when connection to the first electrode is made by a spring clip or other elastically deformed terminal. A preferred process for preparing devices of the invention is described in copending, commonly assigned U.S. Patent Application Serial No.08/257,586, abandoned in favor of U.S. Application Serial No. 08/808,135, now U.S. Patent No. 5,864,281 ~~(Docket No. MP1515-US1)~~, incorporated by reference herein.

Please replace the paragraph beginning at page 4, line 35 by the following amended paragraph.

The various steps of the process are preferably ~~preferable~~ carried out at a temperature substantially below the melting point of the PTC element, in order to minimize changes in its electrical properties.

Please replace the paragraph beginning at page 10, line 13 by the following amended paragraph.

The PTC compositions used in the present invention are preferably conductive polymers which comprise a crystalline polymer component and, dispersed in the polymer component, a particulate filler component which comprises a conductive filler, e.g. carbon black or a metal. The filler component may also contain a non-conductive filler, which changes not only the electrical properties of the conductive polymer but also its physical properties. The composition can also contain one or more other components, e.g. an antioxidant, crosslinking agent, coupling agent or elastomer. For use in circuit protection devices, the PTC composition preferably has a resistivity at 23°C of less than 50 ohm-cm, particularly less than 10 ohm-cm, especially less than 5 ohm-cm. Suitable conductive polymers for use in this invention are disclosed for example in U.S. Patent Nos. 4,237,441 (van Konynenburg et al), 4,304,987 (van Konynenburg), 4,388,607 (Toy et al), 4,514,620 (Cheng et al), 4,534,889 (van Konynenburg et al), 4,545,926 (Fouts et al), 4,560,498 (Horsma et al), 4,591,700 (Sopory), 4,724,417 (Au et al), 4,774,024 (Deep et al), 4,935,156 (van Konynenburg), and 5,049,850 (Evans et al), and copending, commonly assigned U.S. Patent

Application No.07/893,626 (Chandler et al, filed June 5, 1992), now abandoned. The disclosure of each of these patents and applications is incorporated herein by reference.

Please replace the two paragraphs beginning at page 12, line 4 by the following amended paragraphs.

The term "aperture" when used herein in connection with a device of the invention or an assembly of the invention to be converted into a plurality of devices of the invention (but not when used herein in connection with the apertures in a circuit board), denotes an opening which

(a) has a closed cross section, e.g. a circle, an oval, or a generally rectangular shape, or

(b) has an open reentrant cross section which (i) has a depth at least 0.15 times, preferably at least 0.5 times, particularly at least 1.2 times, the maximum width of the cross section, e.g. a quarter circle or a half circle or an open-ended slot, and/or (ii) has at least one part where the opposite edges of the cross section are parallel to each other.

In assemblies of the invention which can be converted ~~divided~~ into a plurality of electrical devices by dividing them along a plurality of lines of division, the apertures will normally be of closed cross section, but if one or more of the lines of division passes through an aperture of closed cross section, then the apertures in the resulting devices will then have open cross sections. It is important that any such open cross section is a reentrant cross section as defined above, in order to ensure that the cross-conductor is not damaged or dislodged during installation or use of the device.

Please replace the paragraphs beginning at page 17, line 6 by the following amended paragraph.

The devices of the invention containing cross-conductors can be prepared in any way. However, the preferred methods of the invention make it possible to prepare devices very economically by carrying out all or most of the process steps on a large laminate, and then dividing the laminate into a plurality of individual devices, or into relatively small groups of devices which are connected together physically and which may be connected to each other electrically, in series or in parallel or both. The division of the laminate can be carried out along lines which pass through one or both or neither of the laminar conductive members or

through none, some or all of the cross-conductors. The process steps prior to division can in general be carried out in any convenient sequence. Preferred processes for making the devices are disclosed in U.S. Patent Serial Nos. 08/242,916 and 08/257,586, both now abandoned, the subject matter of which is in U.S. Patents Nos. 5,831,510 and 5,864,281, respectively, ~~(MP1509-US1 and MP1515-US1)~~ incorporated by reference herein.

Please replace the paragraphs beginning at page 20, line 20 by the following amended paragraph.

The first connection leg can also include a first leg part of the second electrode which is integral with the main part of the second electrode. Preferably, however, the first connection leg includes a residual part of the second electrode which is not connected to the main part of the second electrode and which does not, therefore, play any part of the electrical operation of the device. Alternatively ~~device, alternatively~~, the first leg can consist essentially of the first leg part of the first electrode and the first leg part of the resistive element.

Please replace the paragraphs beginning at page 22, line 1 by the following amended paragraph.

In some cases, however, it is preferred that the device should be one in which the first stand-off sub-portion comprises a first bridge sub-portion which extends across the width of the first connection leg and which does not include any part of the second electrode; and the second stand-off sub-portion comprises a second bridge sub-portion which extends across the width of the second connection leg and does not include any part of the first electrode. Such a device can be prepared by removing a portion of the second electrode from the first connection leg and by removing a portion of the first electrode from the second connection ~~electrode~~ leg, to give a device in which the first distal sub-portion comprises a second residual conductive member which, in the absence of the first bridge sub-portion, would be integral with the main part of the second electrode; and the second distal sub-portion comprises a first residual conductive member which, in the absence of the second bridge sub-portion, would be integral with the main part of the first electrode. In a device prepared in this way, the second residual conductive member is preferably separated from the second electrode by a distance which is at least as great as the minimum distance between the first and second electrodes at any location on the device, e.g. 1.5 to 4 times that distance, and the first residual conductive member is preferably separated from the first electrode by a distance which is at least as great as the minimum distance between the first and second electrodes at any location on the device, e.g. 1.5 to 4 times that distance. The portion of the electrode

which is removed can have a simple shape, e.g. a rectangular strip, or a more complex shape. We have found that the physical strength of the leg can be improved by removing a more complex shape, e.g. a V-shaped portion, of the electrode.

Please amend the paragraph beginning at page 33, line 20 as follows:

A conductive polymer composition was prepared by pre blending 48.6% by weight high density polyethylene (Petrothene LB832, available from USI) with 51.4% by weight carbon black (Raven 430, available from Columbian Chemicals). The blend was mixed in a Banbury mixer, and the resulting composition was extruded through a 63.5 mm (2.5 inch) extruder to form a sheet with a thickness of 0.51 mm (0.020 inch). Two sheets of extrudate were laminated together to give a sheet with a thickness of about 1 mm (0.040 inch). The sheet was laminated on each side with 0.025 mm (0.001 inch) thick electrodeposited nickel foil (available from Fukuda) and the laminate was irradiated to a dose of 10 Mrad using a 4.5 MeV electron beam. An electrical device with a shape as shown in Figure 9 ~~4~~ was cut from the irradiated sheet. The main portion had a width of approximately 7.75 mm (0.305 inch) and a length of approximately 19.7 mm (0.775 inch). The first connection leg and the second connection leg each had a length of 5.25 mm (0.207 inch). There was a maximum distance between the first and second connection legs at the first and second distal sub-portions of 3.8 mm (0.150) inch, and a distance between the step of the first standoff sub-portion and the step of the second standoff sub-portion of 2.0 mm (0.0W inch). The length of the first bridge sub-portion on the first connection leg and of the second bridge sub-portion on the second connection leg was 1.27 mm (0.05 inch). The first and second bridge sub-portions were created by scoring the nickel foil and peeling it completely away from the conductive polymer resistive element.